

# Impact of Giving

September 2022

How you're inspiring our response  
to society's greatest challenges



# Every gift drives new thinking

In 2021/22, Academy supporters contributed **£4,698,881**, enabling us to invest in our programmes and make a crucial impact in society. We can't thank you enough.



# With you by our side, we go further

If there is one theme that stands out throughout this publication, it is, perhaps, responsiveness. Thanks to you, the Academy can respond with increased ambition and energy – and on a greater scale – to the many challenges that demand our attention.

We can respond to the skills shortage that persists within engineering, reaching more people from more backgrounds and creating opportunities that encourage diversity to thrive.

We can respond to the changing needs of our engineering community, nurturing and recognising new talent and fostering the conditions for collaboration and shared learning.

And we can respond to the issues that will define our global future, driving innovation and providing pioneering thought leadership. As you can read in this report, in 2021/22 this ranged from identifying technologies that slow the spread of pandemics to showing the central role engineering must play as we transform our infrastructure to decarbonise our economies.

We are only able to respond and lead the way forward thanks to people like you. Our Fellows, friends, corporate partners, universities, charitable trusts, foundations, and Exceptional Pledgers. Your generosity is fundamental to all of the progress captured in this report. I hope it leaves you with a clear sense both of the profound impact you are creating and of our enormous gratitude for your commitment to our work.

Thank you for being with us on this journey.

**Professor Sir Jim McDonald FREng FRSE**  
President, Royal Academy of Engineering



# The progress you make possible

**764,000** STUDENTS ENGAGED WITH STEM ACTIVITIES OVER THE LAST DECADE

**73%** OF STUDENTS WHO SAW THIS IS ENGINEERING NOW CONSIDERING A CAREER IN ENGINEERING

An inclusive **ECONOMY** that works for everyone

A more **SUSTAINABLE** society

**5,000** NEW JOBS CREATED BY ENTERPRISE HUB MEMBERS

THE EXPERTISE OF **450,000** ENGINEERS REPRESENTED BY THE NEPC

It all begins **WITH YOU**

**AFRICA** PRIZE-WINNING INNOVATIONS PREDICTED TO IMPACT THE LIVES OF 3M PEOPLE IN THE NEXT 5 YEARS

**Engineering X** international collaborators based in Colombia, Ghana, India, Jordan, Kenya, Malawi, Mexico, Nigeria, Peru, South Africa, Thailand, Turkey and the UK

## THANK YOU

for standing side-by-side with the engineers transforming our future.

# Celebrating the life of our Senior Fellow

We were deeply honoured to launch the Prince Philip Fund in 2021 to remember and continue the legacy of our late Founding Senior Fellow, HRH The Duke of Edinburgh.

Prince Philip was a passionate, lifelong advocate for engineering and technology. He played a central role in our formation as the Fellowship of Engineering in 1976, and remained our Senior Fellow throughout his lifetime. A regular visitor to the Academy, Prince Philip thrived in challenging discussions with the engineers he met here.

We celebrated Prince Philip's invaluable contribution to the Academy and to engineering more widely at a special commemoration event in October 2021. Speaking to an audience that included many Fellows and Prince Philip Medal winners, HRH The Princess Royal praised the Academy's role in bringing people together to solve society's most pressing challenges.

We were also delighted to launch the Prince Philip Fund at the event. Thanks to the vision of Prince Philip and those who choose to honour his legacy, the fund will help support the full breadth of our work: fostering new talent; driving innovation; building unrivalled partnerships; pushing for effective policy change; and engaging the public more closely than ever with engineering. The fund will invest wherever the need is greatest and will be a fitting tribute to Prince Philip, who was at the heart of our work for so many years.

"Everything that wasn't invented by God was invented by an engineer."

**HRH The Prince Philip, Duke of Edinburgh KG KT OM GBE, 1921 to 2021**



HRH The Princess Royal signs the Fellows' Book during the reception to commemorate our late Senior Fellow, HRH The Duke of Edinburgh

**"I encourage young women to believe in yourself, find your passion, work hard and apply yourself... and, most of all, follow your dreams."**

Prince Philip's legacy will also live on through the Prince Philip Medal – our highest award for exceptional engineering contributions. In 2021 it was awarded to Dr Gladys West for her pioneering mathematical modelling, which paved the way for GPS.



Dr Gladys West

# What does the Academy mean to you?

Our incredible supporters – from Fellows and friends to corporate partners, universities, trusts, and foundations – inspire us every day.

So we wanted to understand more about what inspires you and why you donate to our work.

Here's what we found out.



“

Engineering has given me a fantastic career, and I am indebted to the profession and many exceptional entrepreneurs from whom I have learnt a great deal. I am delighted to now be able to support a new generation of entrepreneurial engineers to scale their businesses and succeed.”

**Ian Shott CBE FREng**, elected in 2008



“

The Enterprise Hub gave me the start I needed – without it, I wouldn't be in the position I am today with a successful healthcare business. I can't pay back the people who supported me, but I can support other engineering entrepreneurs who will need support in the future.”

**Dr Felicity de Cogan,**

Enterprise Fellowship alumnus and Exceptional Pledger



“

Being part of the Academy gives me the opportunity to help shape how engineering and the engineering profession develop in the UK, especially with regard to education and the Government. I donate to help the Academy fulfil its aims and advance engineering's contribution to society.”

**Richard Maudslay CBE FREng**, elected in 1994



“

I donate to the Academy because I wish to encourage young women and Black, Asian and minority ethnic students to pursue a career in engineering. I am keen to see engineering making a difference in our societies today.”

**The Reverend Patrick O'Ferrall OBE HonFREng**, elected in 2000



“

As an academic, I feel it essential to support the Academy's programmes encouraging young people to start studies in engineering. Setting up sessions in schools and presenting resource packs will give them a well-rounded introduction to such a career, and develop skills in innovative practices.”

**Professor Marie-Madeleine Martinet**, friend of the Academy



“

bp is proud to support *This is Engineering*, a groundbreaking campaign transforming perceptions of engineering and the role that engineers play in society. At bp, we are aiming to be a NetZero company by 2050 or sooner and help the world get there too. To achieve this we are attracting and developing talented engineers, and are delighted to work with the Academy to achieve the common aim of inspiring a diverse and skilled pipeline of engineers to serve society.”

**Aleida Rios FREng**, elected in 2021

Senior Vice President of Engineering at bp, a Principal Partner of the Academy

Whatever the reason you donate to the Academy, we'd like to say thank you. It's because of you that we can help shape the future of engineering and its impact on the world around us.

## Your impact on... Talent and diversity

As the UK rebuilds from COVID-19 and targets a net zero future, the need for highly skilled engineers and technicians is clear and urgent. With your support, we're targeting the skills crisis in engineering – by firing imaginations in schools and ensuring people from every background have the opportunities to thrive.



Dover Grammar School students using Academy kits



CST collaborative projects

### Challenging future engineers

To celebrate the 10<sup>th</sup> anniversary of our Connecting STEM Teachers (CST) programme, we launched the nationwide Sustainable Futures Innovation Challenge in September 2021. More than 1,500 students aged 9 to 14 took part, finding creative ways to improve our homes, transport, food and lifestyles. Winning ideas included a letterbox that stops heat loss and a reusable container made from seaweed, but perhaps the biggest impact was how the challenge built young people's confidence. Many teachers told us students loved realising they could already be STEM innovators.

The challenge highlights why the CST programme is so impactful. Through CST, we support teachers to engage more pupils from more backgrounds in engineering and STEM subjects. In the 2020/21 academic year, we supported more than 1,000 schools in some of the UK's most underserved areas. The result? Close to 200,000 STEM experiences for pupils, created using our resource boxes and online teaching and learning materials.

CST is fully funded by corporate support and philanthropy, so we'd like to thank everyone who is helping us open young people's eyes to engineering in this way. Special thanks are due to Shell, a founding strategic partner of this programme.



**We are in an area of lower social aspiration ... The combination of the Academy CST kits, the teaching resources and online information has been incredibly helpful. The results have been striking in terms of how students perceive the world of STEM, with some students reassessing their options and career routes."**

#### Gerard Cocker

Leader for Design Technology,  
Dover Grammar School for Girls

### Supporting future engineering leaders

Our Engineering Leaders Scholarships (ELS) programme gives undergraduates with leadership potential the chance to access funding, training, mentoring, networking, and invitations to Academy events. In 2021, University of Cambridge student Ben James used his scholarship to get the inside track on COP26 and develop an innovative way to raise climate awareness.

At the COP26 conference in Glasgow, Ben built numerous contacts across climate-related sectors. He hopes to focus his engineering knowledge on climate innovation after graduation. He also set up the Cambridge Climate Society, and he won first prize at the Global Leadership Challenge in Oxford for a team project that uses WhatsApp to make climate education accessible.

We would like to thank everyone who opens up new opportunities to students like Ben by kindly supporting ELS and our Sir Ralph Robins Scholarships. Sir Ralph had a long and distinguished career at Rolls-Royce plc, and the scholarships, dedicated to him, provide additional support to three ELS recipients from lower-income backgrounds.



**The ELS and Sir Ralph Robins Scholarship have been nothing less than transformative for me. The ELS award has enabled me to pursue personal growth at a vastly quicker rate than would otherwise have been possible. As a first generation student, the Sir Ralph Robins Scholarship enabled me to not only attend university, but to take full advantage of the academic and professional opportunities on offer."**

**Ben James** was awarded the scholarships in 2020



Lucy Hughes, ocean protector, product designer and Founder of MarinaTex. *This is Engineering* ambassador

### Showing millions the potential of engineering

With our 2021 *This is Engineering Day* timed to coincide with COP26, we showed the world what a net zero future could really look like – and ignited conversations across the globe.

Working with a digital artist, we reimagined masterpieces by Monet, Van Gogh, Constable and Pissarro to get people talking about how engineers could shape a net zero future. Vertical farms, flying taxis, smart thermochromic windows and agricultural robots were all added to the landscapes – following input from expert engineers in the Fellowship and wider networks, and from *This is Engineering* partners and supporters. The 'Engineer the Future' artworks attracted huge interest, with COP26 *This is Engineering Day* content achieving a total media reach of 33 million and coverage across the BBC, Channel 4, *The Times* and more.

We launched the *This is Engineering* campaign in 2018 to challenge misconceptions of engineering. It helps young people from every background to see why engineering is such an exciting and engaging career choice. *This is Engineering* relies on philanthropy and corporate support and, thanks to the generosity of our funders and partners, it continues to raise huge awareness. Since 2018, campaign films have been watched more than 57 million times – inspiring many more young people to consider a career in engineering.

### Pushing for parity for women

In 2020, just 18% of applications to engineering degrees were from women. At the current rate of progress, it will be 2085 before women and men are equally represented on engineering degree courses. It's time for change.

As part of our ongoing push for parity, in 2021 we launched the Amazon Future Engineer bursary. It's designed for A-level and further education students who are women and from lower-income households. It aims to give recipients the best chance not only to study engineering at university in the UK, but to thrive while they do.

Each bursary provides £5,000 per year throughout an engineering or computer science degree. This removes some of the financial barriers that can stop people continuing their studies.

The first cohort of students are already leading the way on courses from creative computing to electrical engineering. We would like to thank our strategic partner Amazon, which is funding the bursary as part of its Amazon Future Engineer programme.



**To be entrusted with the Academy's hopes for a more woman-powered future in the STEM industry is a great responsibility; it motivates me to utilise the resources I have been given. Undoubtedly, the financial support [from the bursary] has been an answer to my prayers because a Computer Science degree would have been a remote possibility otherwise."**

**Neda Naseer** is studying Computer Science at University of Reading, supported by an Amazon bursary



In 2019, Sir Lewis visited the Academy after his election as an Honorary Fellow

### Building diversity in motorsport

We're setting up a new Masters level motorsport scholarship for Black students, thanks to support from the Ignite Partnership – a joint initiative between Sir Lewis Hamilton MBE HonFREng and the Mercedes-AMG PETRONAS F1 Team.

The Ignite Partnership was launched in 2021 to increase diversity and inclusion in motorsport. To this aim, it supports improving pathways for people from underrepresented groups to build STEM careers in the sport. Research from The Hamilton Commission, which was formed by Sir Lewis alongside the Academy, found that few Black engineering students were moving into UK motorsport. In 2022, Ignite chose the Academy to help it respond.

Starting in 2023/24, we will now fund at least five final-year undergraduates each year to study for a specialist MSc in engineering or another subject sought after by the motorsport industry. Up to £25,000 of funding will cover all tuition, living costs and provide wrap around supports to enable awardees to gain employment in motorsport. The project is another example of how, with our partners and supporters, we can build an inclusive economy that works for everyone.

"More than ever we must focus on how we can use action to change motorsport for the better and this is an exciting next step." Sir Lewis Hamilton MBE HonFREng.

### Welsh Government supports school outreach programme in Tech Valleys

A perfect example of how support from corporate partners and foundations can be a catalyst for major progress, our Welsh Valleys Engineering Project (WVEP) was set up in 2018. Initially funded by the Panasonic Trust to boost involvement and success in STEM subjects in schools, the project attracted additional support from the Waterloo Foundation and the David Family Foundation.

Then, in 2021, we were invited by the Welsh Government to apply for funding through its own Tech Valleys programme. Our application was successful, and as a result the WVEP is now inspiring and encouraging pupils in all 54 schools across Blaenau Gwent and Merthyr Tydfil.

Through WVEP, we provide teacher training, resources, grants and bursaries and, crucially, build close partnerships between schools and local employers. By bringing real-world engineering into schools in the Tech Valleys area we can show pupils the opportunities engineering offers and help them develop the skills to thrive. We're now looking to build links with even more local employers – as we keep unlocking the engineering potential of pupils across the Welsh Valleys.



School students at the Welsh Valleys Engineering Project Five-Year Celebration in July 2022 in Merthyr Tydfil, Wales



**This excellent Tech Valleys supported programme means pupils have access to the knowledge and experience of professional engineers, giving them authentic real-life experiences and bringing the world of work into the classroom. There isn't a better way of seeing how engineering affects our lives, and how diverse the opportunities are for a career."**

**Vaughan Gething MS**

Welsh Economy Minister

**In the first five years of the Welsh Valleys Engineering Project, more than 15,000 young learners have participated in at least one engineering experience, 75 bursaries have been awarded to post-16 students studying STEM subjects, and over 1,500 students have engaged with a STEM challenge developed with local employers.**

# Your impact on... Innovation

Investment, collaboration and recognition are all vital to ensure the best new ideas can create lasting impact. Thanks to our supporters, we've made all of these things possible in recent months – everywhere from remote African communities to Scottish construction sites.

## Championing African trailblazers

There can hardly be a more timely example of engineering's potential to solve society's challenges than Vaccibox. This small, mobile, solar-powered fridge safely transports vaccines for use in field vaccinations and remote clinics. Its designer, Norah Magero, won our 2022 Africa Prize for Engineering for her innovation, and we are looking forward to seeing Vaccibox develop and grow. As Alessandra Buonfino, one of the Africa Prize judges, said: "Norah truly represents the idea that one innovator can change an entire community".

Our *Engineers for Africa* report first highlighted a shortage of engineering skills in the region back in 2012. Ever since, our Academy Fellows and supporters have helped our work to grow across the continent. The Africa Prize is now Africa's biggest award for engineering innovation, and we have also built extensive Higher Education Partnerships across sub-Saharan Africa and helped to strengthen professional engineering bodies through our Africa Catalyst programme.

By enabling us to work across each of these key programmes, supporters like you are helping to improve knowledge and skills, increase local capacity, share best practice, and develop scalable solutions to local challenges – such as Vaccibox.



Norah Magero



Professor Paul Shearing

## Recognising groundbreaking talent

Professor Paul Shearing has had a long and fertile relationship with the Royal Academy of Engineering. He was initially involved in Academy programmes as an A-level and undergraduate student and, in 2014, was awarded one of our Young Engineer of the Year prizes. In 2016, he was awarded an Academy Research Fellowship at University College London, to tackle key challenges in electrochemical energy conversion.

Now one of the Academy's Chairs in Emerging Technologies, in 2022 Paul was awarded a Princess Royal Silver Medal to celebrate his continuing contribution to UK engineering. The prize was given jointly to Paul and Professor Daniel Brett for launching the Electrochemical Innovation Lab at UCL.

Since opening in 2011, the lab has become a leading centre for electrochemical technology in the UK. Over 100 researchers now work there to find solutions that could accelerate our route to net zero, and together they have secured more than £45 million in R&D funding. The lab is designed to help innovation and collaboration thrive, with a range of mentoring and training on offer. So it's no surprise that businesses focused on low-cost fuel cell engineering, fast-charging battery technologies and low-cost hydrogen electrolyzers have all formed there.

Congratulations to Paul and Daniel and thank you to everyone who supports our work and helps innovation in engineering to flourish.



March 2022 Shott Scale Up Accelerator Awardees

## Accelerating UK businesses

It's been a big year for our Enterprise Hub, which provides funding, training, networking, and mentoring for the nation's brightest engineering and technology entrepreneurs.

Our Enterprise Fellowships programme, which provides entrepreneurial engineers with funding of up to £75,000 and a 12-month package of bespoke support, was ranked third in Sifted's UK accelerator league table. Sifted, the startup-focused website launched by the *Financial Times*, tracked the accelerators that sponsored the most startups between 2011 and 2018.

**To increase our support for aspiring engineers right across the UK, the Enterprise Hub is expanding.**

Our new Regional Talent Engines programme will provide tailored support in Northern Ireland, North West England, North East England, and Yorkshire & Humber.

A substantial gift from Academy Fellow Ian Shott CBE FEng also helped us launch the Shott Scale Up Accelerator in 2021. This will now provide six months of support twice a year to help decision-makers in fast-growing SMEs build their leadership skills. The focus is on businesses in areas with key strategic importance for the UK – including artificial intelligence (AI), energy and bioinformatics.

And entrepreneurs that were already part of the Enterprise Hub continued to prosper. Wootzano, which has developed a pioneering fruit-picking robot, signed a £300 million deal with one of the UK's biggest fresh produce companies and raised over £2.5 million in follow-on funding. And Kenoteq, founded by Dr Sam Chapman, received £1 million from Zero Waste Scotland to expand production of K-Briq – its brick made from construction waste.

Success stories like these are only possible because of our supporters. Your generosity sets us apart from standard accelerators, because it means we can help turn brilliant ideas into reality without taking equity in return.



**I am looking forward to the mentorship, training courses and networking opportunities. It will enable me to develop effective communications skills for those non-technical parts of our business."**

## Carlton Cummins

Co-Founder and CTO of Aceleron Ltd and Shott Scale Up Accelerator awardee

## Your impact on... Influencing policy change

As we face up to challenges from climate change to post-pandemic recovery, the need for collaboration between policymakers and engineers is greater than ever. Thanks to our supporters, we make sure the insights of the engineering community are at the heart of policy decisions worldwide.

### Showing the way to net zero

Before and during the COP26 climate conference, we used a wide range of tactics to show the crucial role engineering must play as we strive to decarbonise our economies.

In our *Getting to net zero* video explainers, engineers described why we need a new approach to transforming infrastructure. We also published briefings outlining topics including reducing emissions from construction and how engineering systems approaches can help manage complex change. And our *Ask the Engineers* online panels, chaired by *Economist* science correspondent Alok Jha, explored issues raised by COP26 from an engineering perspective.

COP26 was only one moment, of course, and thanks to your support we will continue to press for policy action at every level. Our profession can offer solutions to this crisis, but we will only drive change if we work with urgency, ambition and through constant collaboration.



©bp



Nightingale Hospital in Manchester ©thisisjude.uk 2020

### Shining a light on infection control

The National Engineering Policy Centre (NEPC), brings together 43 professional engineering organisations, led by the Academy. It's the NEPC's role to put engineering thinking at the heart of policymaking.

In 2021, in response to a request by Sir Patrick Vallance FRS FMedSci, Government Chief Scientific Adviser, the NEPC published a report into infection control in buildings and on public transport. We recommended a range of responses – from contactless technologies to plumbing, drainage and ventilation systems.

One key recommendation – on the role of ventilation in reducing the risk of COVID-19 – directly influenced the government's messaging. The Cabinet Office has also begun to implement the report's recommendations and has set up a Technical Advisory Group on ventilation with a strong engineering presence. With your support, we make sure the voices of engineers are heard and acted upon.



Children carry water next to smouldering waste in Douala, Cameroon ©WasteAid

### Tackling open burning of waste

The open burning of waste is a scourge worldwide. It has major implications for public health and our climate, but a lack of data means the true scale of the problem is unknown.

In 2021, our Engineering X programme set its sights on finding out more and pushing the issue up the global agenda. Engineering X is an international collaboration, founded in partnership with, and thanks to generous support from, the Lloyd's Register Foundation.

We began by partnering with the International Solid Waste Association to run a series of multidisciplinary workshops on the open burning of waste. Members of Engineering X then published a report on the related challenges and opportunities in Africa. And we partnered with the United Nations High Level Climate Champions team to raise the topic and bring people together to seek solutions.

With momentum growing, at COP26 a panel of expert speakers discussed Engineering X's work on burning waste at a UN side event – the first time the topic had been raised at a high-level forum. With further support, this work will increase in the run up to COP27 – as part of our efforts to contribute to a safe, sustainable future.



Partnering with the Academy and leveraging the expertise of its Fellowship has enabled us to design and deliver impactful programmes worldwide through our international collaboration, Engineering X. Together, we are tackling complex global challenges and striving for a safer and more sustainable tomorrow."

**Dr Ruth Boumphrey**

Chief Executive, Lloyd's Register Foundation



# An investment in the future

In 2022, generous legacy gifts left to the Academy once again played a critical role in our support for research, innovation, policy and entrepreneurship. It is a true privilege to be the custodian of these gifts.

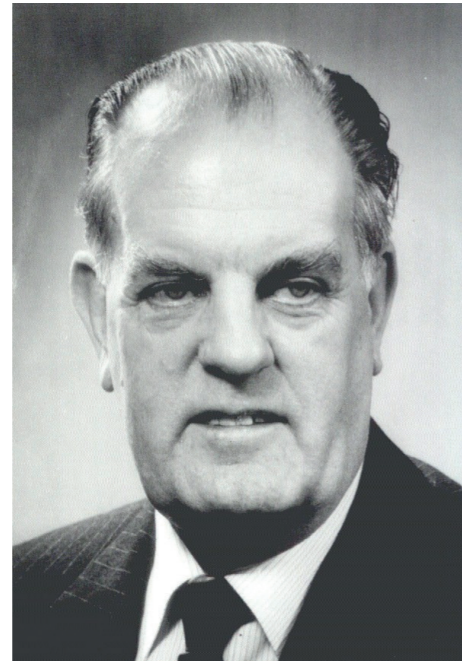
Sir Denis Rooke OM CBE FRS FREng, a former President of the Royal Academy of Engineering and Prince Philip Medal winner, was a trailblazer throughout his distinguished career.

His greatest technical achievement was to build the UK's gas distribution network, and his commitment to engineering excellence was matched by his determination to keep improving the equality of engineering education. This was a key focus of Sir Denis' time both as our President and as Chancellor of Loughborough University.

We were honoured, therefore, that Sir Denis included a significant gift to the Academy upon his death in 2008. We also received a further substantial gift from Sir Denis' estate when his wife Lady Brenda Rooke passed away in 2017. We cannot overstate our gratitude for this incredible support and vote of confidence.

Sir Denis understood well the true power of engineering for society. His gift helped us create a national Forum for Engineering so the impact of engineering could continue to evolve and grow. By donating in this way, Sir Denis ensured both his legacy and his passion would live on. We owe him – and everyone who leaves a bequest to the Academy – our heartfelt thanks.

**For more information on leaving a gift to the Academy in your will, please visit [www.raeng.org.uk/support-us](http://www.raeng.org.uk/support-us)**



Sir Denis Rooke OM CBE FRS FREng



# Thank you from our CEO

One of the values that guides all of our work at the Academy is 'collaboration first'. Every organisation and individual named on the following pages is at the heart of this collaboration. Put simply, we couldn't do what we do without you.

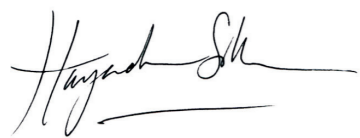
Engineering has always been a discipline built on alliances and on innovation towards shared goals. Engineers know instinctively that progress depends on working together, on learning together, on encouraging each other forward.

Today, in the face of monumental global challenges, this commitment to collaboration is perhaps more necessary than ever. Only through partnership can we hope to make the radical shifts needed to address the issues that will define our generation, including climate change, international security and pandemic preparedness.

Every individual, corporate partner, university, charitable trust and foundation named here is an important part of our team. You have made possible the impact described in this report, and with your support we are working harder than ever to build a sustainable society and an inclusive economy that works for everyone.

So I hope, as you look back on 2021/22, you are as proud as I am of how much we have achieved together. By always putting collaboration first, we will harness the true power of engineering to serve society – today, tomorrow and long into the future.

Thank you for your invaluable support.



**Dr Hayaatun Sillem CBE**  
CEO, Royal Academy of Engineering



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# Our work would not be possible without our community of supporters

We send our appreciation to every individual and organisation named on this role of honour.

## Organisations and universities who have supported us in the last year, with special thanks to our partners

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### Principal partner



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**Individuals and foundations whose gifts have had a transformative impact at the Academy**

**Principal gifts**

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Dr John Taylor OBE FREng  
With additional thanks to our principal donors who wish to remain anonymous.

**Charitable trusts and foundations generously supporting the Academy**

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The Ezra Charitable Trust  
The Happold Foundation  
Ignite Partnership  
The Leverhulme Trust  
Shell Centenary Scholarship Fund  
The Worshipful Company of Engineers

**Fellows, friends, awardees and Academy staff who have given in the last three years**

**Major donors**

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With additional thanks to our major donors who wish to remain anonymous

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